



This document contains the Comprehensive Conservation and Management Plan for Narragansett Bay, December 1992: Source Control: Boater Discharges and Source Reduction: Nonpoint Sources.

The report (narragansett_ccmp_pt7.pdf) can be downloaded from:

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December 1992

04-01-06 Source Control: Boater Discharges

Objective for the Management of Boater Discharges

The State of Rhode Island and the Commonwealth of Massachusetts should reduce or eliminate the discharge of untreated and partially treated sewage from vessels operating in Narragansett Bay in order to assist in meeting the states' water quality goals, and to restore and protect water quality-dependent uses of the Bay.

Introduction

Boating is a desirable water-dependent use of the Bay for commercial, recreational and economic reasons. However, boaters operating within Narragansett Bay potentially represent a seasonally and locally significant public health risk related to the improper treatment and disposal of boater-generated sewage. The magnitude of the problem is related to the location of boat anchorages with respect to bathing and shellfish harvesting areas, boat density, and the lack of publicly available toilet and pump-out facilities (Karp and Penniman, 1991:1). In addition, it should be noted that boater discharges of floatables (trash, sewage solids), solvents (marine paints, antifreeze, cleaning agents), and petroleum derivatives (gasoline, oil, grease) also contribute to water quality and habitat degradation. Recognizing the importance of boating and related marine activities, the goal of abating boater discharges is to protect public health, prevent water quality and habitat degradation, and restore and protect water quality-dependent uses of the Bay.

Statement of the Problem

There were over 160 private marinas, yacht clubs, boat yards, town docks, and launching ramps operating in Narragansett Bay, including Mount Hope Bay, in summer of 1988 according to *Boating Almanac* estimates. These facilities provided in excess of 15,000 berths, slips, and moorings for recreational and commercial vessels, not including storage on land. The actual level of boating activity in Narragansett Bay is, however, much

higher than reported slip capacity. Over 32,500 boats were registered with the Rhode Island Department of Environmental Management (RIDEM) Division of Boating Safety in 1991 compared to 29,900 in 1990; 28,500 in 1989; and 29,000 in 1988. In excess of 28,000 additional boats—including vessels documented by the U.S. Coast Guard (18,000), visitors (6,000), boats registered in Massachusetts and operating in Bay waters (number unknown), and vessels not required to register (4,000)—are also estimated to have used Rhode Island waters in 1988 (Roman, 1990; Karp and Penniman, 1991:i).

Land-based toilet and pump-out facilities for boaters are scarce in Narragansett Bay relative to the current level of boating activity. Based on the U.S. Environmental Protection Agency's (EPA) recommended formula of one pump-out station per 300 boats with marine sanitation devices (MSD) in "transient" harbors, and one pump-out station per 600 boats with MSDs in "parking lot" harbors for the use of both resident and transient boaters, approximately 30 pump-out facilities should be in service in Narragansett Bay based on 1988-1992 boat registration statistics. However, only five marine pump-out facilities were available in Narragansett Bay waters in 1990 and 1991 although eight stations are expected to be in operation in Narragansett Bay by June 1992. In addition, several coastal communities, including Warwick and Cranston, are planning to install municipal pump-out facilities as part of their *Harbor Management Plans*. Furthermore, as of summer, 1988, only 27 percent of the marinas, yacht clubs, and boat launching facilities throughout the Bay were reported to have shoreside toilet facilities. As a result, vessel discharges to the Bay can be inferred from the scarcity of suitable disposal options.

Boater wastes can be a significant public health problem if untreated or partially treated sewage discharges occur in poorly flushed or shallow waters in the vicinity of shellfish harvesting areas and bathing beaches (Karp and Penniman, 1991:3). For example, the RIDEM has closed approximately 115 acres in the coves surrounding Greenwich Bay, in part because of the ob-

served exceedance of fecal coliform concentrations in waters adjacent to marinas (Karp and Penniman, 1991:1). Boater discharges of sanitary wastes, however, represent only one source of fecal contamination to coastal waters. Other sources of contamination in suburban areas of the Bay include runoff and leachate from on-site sewage disposal systems (OSDS), illegal subsurface drains from OSDS leach fields, and illegal sewer connections to stormdrains. In urban areas such as the Providence River basin, vessel discharges are relatively insignificant compared to municipal wastewater treatment facility (WWTF) and combined sewer discharges.

Existing Policies

Section 312 of the federal Clean Water Act governs vessel discharges to all navigable waters of the United States, including Narragansett Bay. Under Section 312, untreated wastes from vessels with installed toilets must either be discharged beyond the three-mile limit or transferred to land for proper treatment and disposal. Direct discharge to state waters is permitted if and only if the waste is properly treated (macerated and disinfected) on-board with a Type 1 or Type 2 MSD. Section 312, as amended in 1987, authorizes the U.S. Coast Guard—and the states to enforce discharge prohibitions with respect to all vessels with installed heads. Both Rhode Island and Massachusetts re-negotiated their existing "statements of understanding" with the U.S. Coast Guard in March 1991 to begin implementing their authority to enforce federal MSD standards for vessels operating in State and Commonwealth waters.

The RIDEM is separately authorized to enforce prohibitions on the unpermitted disposal of pollutants, including untreated or partially treated sewage, to Rhode Island's surface waters (R.I.G.L. 46-12-5). In addition, RIDEM is required to investigate the sanitary quality of shellfishing waters (R.I.G.L. 20-8.1-3), and to determine whether the waters are "polluted" based on direct fecal coliform measurements or "evidence that significant volumes of fresh raw sewage or inadequately purified sewage may reach

the area intermittently" (R.I.G.L. 20-8.1-4) (Karp and Penniman, 1991:1). Acting on existing legislative authority and the states' expanded authority to enforce Section 312, the Rhode Island General Assembly enacted R.I.G.L. 46-12-39, "Discharge of Sewage from Boats," in 1991 to enable the RIDEM to enforce federal MSD standards in Rhode Island waters, including Narragansett Bay, and enforce vessel sewage discharge prohibitions in "no-discharge areas" designated by EPA.

Several mechanisms also exist to enable the states to regulate the shore-based operations of marine facilities. The Rhode Island Coastal Resources Management Council (CRMC) encourages coastal communities to include provisions for marina pump-out facilities in their local *Harbor Management Plans*. In addition, the CRMC specifically prohibits the construction or expansion of marinas in Type 1 waters, the construction of new marinas in Type 2 waters, and the placement of new moorings areas in Type 1 waters. The CRMC does allow new mooring areas and expansions of existing mooring areas in Type 2 waters and allows for the continued operation of marinas in Type 2 waters (CRMC, 1983:23-24). Similarly, the RIDEM prohibits expansion of marinas and mooring fields in Class SA waters because these waters are deemed suitable for bathing and contact recreation, shellfish harvesting for direct human consumption, and fish and wildlife habitat (RIDEM/DWR, 1984:10). The Massachusetts Department of Environmental Protection (MADEP) Division of Wetlands and Waterways Regulation can require marine sewage pump-out stations to be installed as a licensing condition at new boating facilities, and at existing facilities that propose to expand by ten or more berths above existing capacity.

The Clean Water Act Section 401 water quality certification process represents another means for state agencies to comment on a marine facility's plans to control boater-generated sewage, as well as runoff and leachate from boatyard, parking, fueling and dredging operations. CRMC, for example, requires applicants to obtain a Section 401 water quality certification from RIDEM as a

prerequisite to licensing new or expanded marine facilities, and permitting dredging operations. Finally, the 1990 amendments to the federal Coastal Zone Management Act (CZMA) require states' coastal management and nonpoint source management programs to prepare Coastal Nonpoint Pollution Control Plans in coordination with existing Clean Water Act nonpoint source programs and policies established under Sections 208, 303, 319 and 320 [See 04-01-07 Source Reduction: Nonpoint Sources for further discussion of Section 6217 Coastal Nonpoint Pollution Control Plans]. The Section 6217 Coastal Nonpoint Pollution Control Plans are expected to provide the states with a powerful regulatory tool for reviewing all aspects of marine facility operations in order to better protect marine receiving waters. The EPA issued draft guidance on management measures to be used under CZMA Section 6217 in May 1991; the states' coastal management and nonpoint source management programs are expected to begin preparing Coastal Nonpoint Pollution Control Plans in 1992.

Analysis

The effectiveness of the initiatives described above may be compromised by existing boat density and use, the limited availability of marina pump-out facilities, and the increasing demand for recreational boating on Narragansett Bay (Karp and Penniman, 1991:3). The rate of compliance with federal MSD requirements for treatment of sanitary waste has been estimated by EPA to be as low as ten percent (Karp and Penniman, 1991:15). However, the federal and state governments' ability to enforce compliance with equipment requirements or prohibitions on boater disposal of untreated sewage is severely limited by the logistics of inspecting individual boats.

The relative significance of boater discharges into the Bay is also difficult to determine, except in coves and embayments where no other anthropogenic sources of fecal contamination exist (*e.g.*, Potters Cove, Prudence Island). In developed harbors and marinas, for example, boaters represent only one of several possible sources of fecal contamination. Other potential sources include

runoff and leachate from failed and failing septic systems, illegal subsurface drains from OSDS leach fields, and storm drains conveying human and animal waste. In major urban areas such as the Providence River, WWTFs, and combined sewer overflows (CSO) represent the major source of fecal contaminants.

Boater discharges are not easily quantified because boats are mobile, boat use and occupancy rates are variable, and discharges are likely to be surreptitious and sporadic. However, an indirect estimation procedure comparing inputs of fecal waste from boats to the entire Bay with other sources indicated that boater discharges would be closely comparable to the estimated daily inputs of fecal coliform bacteria from the Blackstone and Taunton Rivers (Karp and Penniman, 1991:3). Furthermore, measured levels of fecal coliforms from the Great Salt Pond on Block Island show summer increases exceeding 200 coliforms/100 ml water during periods when large numbers of boats are present (Committee for the Great Salt Pond, 1992:1). [Note that concentrations exceeding 15 coliforms/100 ml are considered unsafe for shellfishing, and that concentrations exceeding 50 coliforms/100 ml are considered unsafe for swimming.] The present level of boating activity and the scarcity of waste disposal options in Narragansett Bay suggests that boater discharges can be a locally significant source of fecal contaminants and pathogens in poorly flushed or shallow waters, and are of particular concern near shellfishing and swimming areas (Karp and Penniman, 1991:3).

In 1990-1991 two groups of government and trade organization representatives, meeting respectively under the auspices of the Rhode Island Marine Advisory Service's Boat Sewage Management Task Force and the Narragansett Bay Project's (NBP) Boater Waste Round Tables, recommended that sewage pump-out facilities be strategically located around Narragansett Bay to provide recreational and commercial boaters easy access. Factors that have been identified as significant in determining the appropriate ratio of boats per pump-out facility include EPA's recommended formula for determin-

ing pump-out density, the number and length of vessels requiring pump-out services, geographic location of the facility, public notice of pump-out locations, accessibility to boaters, ease of use, and cost per pump-out (Karp and Penniman, 1991:7).

Sanitary wastes collected at marinas still require treatment prior to disposal whether the wastes are handled as septage or discharged directly to a WWTF. Marinas must treat the waste on-site in an OSDS, hold the waste on-site and have it periodically pumped by a septage hauler for transport to a WWTF, or directly tie-in to a nearby WWTF (Karp and Penniman, 1991:10).

On-site treatment of boater waste presents problems related to soil type (permeability), depth to water table, seawater intrusion and exchange, and chemical and physical characteristics of the waste that interfere with microbial decomposition [See 04-01-05, Source Control: On-site Sewage Disposal Systems]. On-site holding tanks in the coastal zone are subject to primary problems associated with corrosion and maintenance, and secondary problems related to ultimate disposal at WWTFs. Historically, municipal wastewater treatment facilities were reluctant to accept boat septage out of concern that the concentration of chemical additives used in boat waste (e.g., formalin, chlorine, and hyperchlorous acid) may be toxic to the biological treatment process, or that metals contained in dyes may increase metals loadings to the plant. Several industrial pretreatment program administrators have noted, however, that the additives commonly used to preserve and deodorize boat wastes are quickly broken down when mixed and diluted with normal sanitary wastestreams, and that "benign" disinfection and deodorizing agents are commercially available (Karp and Penniman, 1991:10). In addition, RIDEM officials indicate that Rhode Island WWTFs are currently accepting boat-generated sewage (J. Migliore, RIDEM, personal communication).

Direct marina tie-ins to local WWTFs would, however, eliminate several of the problems described above since treatment would not occur on-site, and the size of the on-

site holding tank could, therefore, be reduced or eliminated. In addition, boater wastes would be continuously discharged to the WWTF at low volumes which would alleviate concerns about possible toxicity associated with chemically-treated boater wastes and septage. WWTF treatment capacity is not an issue since the volume of sanitary waste expected to be generated by boaters per day, according to Rhode Island Division of Planning (RIDOP) estimates, represents less than 0.1 percent of the design capacity of Rhode Island WWTFs (Raytheon, 1978).

In summary, boating represents a desirable water-dependent use of the Bay for commercial, recreational and economic reasons. However, boaters and related shore-based activities also represent a potential seasonal, and locally significant, source of fecal contaminants and other nonpoint source pollutants to the Bay. Most importantly, vessel-related sewage discharges are relatively easy and inexpensive to eliminate if appropriate and convenient disposal options are made available to boaters. Therefore, recognizing the importance of boating and related marine activities to the region, the goal of abating boater discharges is to protect public health, prevent water quality and habitat degradation, and restore and protect water quality-dependent uses of the Bay.

Recommended Policies and Actions and Estimated Cost of Implementation are presented in the following pages.

RECOMMENDED POLICIES AND ACTIONS **SOURCE CONTROL: BOATER DISCHARGES**

CODE	POLICY	AGENCIES	STATUS
I.	The State of Rhode Island and the Commonwealth of Massachusetts should reduce or eliminate boat sewage discharges in order to assist in meeting the states' water quality goals, and to restore and protect water quality-dependent uses of the Bay.		
I.A.1.	The State of Rhode Island should undertake the following administrative actions to identify areas of Narragansett Bay that should be protected from vessel discharges: The Rhode Island Department of Environmental Management (RIDEM) and Rhode Island Coastal Resources Management Council (CRMC) should continue or resume discussions on reconciling RIDEM water quality classifications, CRMC water use classifications, and state regulations regarding uses of tidal waters.	RIDEM, CRMC	[See RIDEM "Preliminary Agreement," Section 715-05-06.]
I.A.2. ✓	The RIDEM Divisions of Water Resources, Fish and Wildlife, and Planning and Development (Natural Heritage Program), and the CRMC should prepare and update maps of critical marine resource areas on a biennial basis. a. These maps should indicate the location of high quality (Class SA; Type 1, Type 2) waters; critical or significant tidal and subtidal habitats; shellfish harvesting areas that are of significant or outstanding commercial or recreational value; threatened or endangered marine flora and fauna; bathing beaches; marine waters where state water quality criteria are currently exceeded; areas targeted for restoration projects; and areas where restrictions on marine expansion, placement of mooring fields and/or boater discharges should apply. b. The maps should be based on existing information, including information compiled by the NBP-funded <i>Habitat Inventory</i> (French <i>et al.</i> , 1992). The maps should be used with the Coastal Resources Management Plan, Special Area Management (SAM) Plans, local <i>Harbor Management Plans</i> , and relevant RIDEM regulations to assess an area's potential to be designated a "special or protected" area or a "no discharge area."	RIDEM, CRMC, Mass. counterparts	See 715-04-02, Protection of Critical Areas Rec. I.B.

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I.B.	The State of Rhode Island and the Commonwealth of Massachusetts should undertake the following actions to establish additional marina pump-out facilities around Narragansett Bay:		
I.B.1. ✓	<p>Develop and implement a Bay-wide pump-out facility plan in order to assure convenient boater access to pump-out facilities.</p> <p>a. Consistent with U.S. Environmental Protection Agency (EPA) guidelines for designating "no discharge areas", the RIDEM and CRMC should work toward establishing one pump-out station per 300 boats with marine sanitation devices (MSDs) in "transient" harbors, and one pump-out station per 600 boats with MSDs in "parking lot" harbors for the use of both resident and transient boaters. This approach should be adopted for all of Narragansett Bay, including portions of Mount Hope Bay and the Taunton River located within Massachusetts, and should be coordinated to the greatest extent possible with marine pump-out facility plans in approved local Harbor Management Plans.</p> <p>b. Regional land-based waste disposal facilities, or mobile pump-out vessels in association with fixed land-based facilities, should be encouraged. These facilities should be directly connected to municipal sewers wherever possible.</p> <p>c. Pump-out facilities should be located at or near central service areas such as fuel docks wherever possible in order to provide convenient boater access and increase the probability of use by boaters.</p> <p>d. Waste disposal facilities funded with public monies should be available to all users and should have controlled fees for a designated period of time.</p> <p>e. Dump stations for "porta-potties" should be provided for boaters.</p>	RIDEM, CRMC, Mass. counterparts	Five pump-out stations were operating in Narragansett Bay in 1991. Three more are expected in 1992. [See RIDEM and CRMC "Preliminary Agreements," Section 715-05-06 re: siting marina pump-outs.]
I.B.2.	Establish and maintain publicly available shore-based toilet and/or pump-out facilities at heavily used state parks with boat facilities.	RIDEM, Mass. counterpart	

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I.B.3.	Coastal communities with municipal marine facilities should establish and maintain publicly available shore-based toilet and/or pump-out facilities.	Municipalities	Jamestown and Warren, R.I. will have municipal pump-outs operating by 1992. The Warwick, Cranston, and Block Island Harbor Mgt. Plans propose municipal facilities.
I.B.4.	All private facilities that service or accommodate boats with MSDs or port-a-potties should provide convenient and affordable shore-based toilet facilities and waste disposal facilities. However, the states should phase in requirements for sewage pump-out stations at private marine facilities, including mooring fields, over a three to five year period in order to: a. Evaluate the performance of existing pump-out facilities, including boater acceptance and compliance. b. Establish procedures for the treatment and disposal of boater wastes. c. Enable the operators of public and private facilities to secure low-cost financing from funding sources such as the Rhode Island Aqua Fund and the State Revolving Funds.	RIDEM, CRMC, Private marine facilities	
I.C.	The State of Rhode Island and the Commonwealth of Massachusetts should undertake the following actions to assure proper collection, treatment and disposal of boater wastes:		
I.C.1.	The RIDEM and the CRMC should continue or resume discussions on developing a written policy for regulating construction of marinas, docks, mooring fields and boater discharges. The agencies will formulate a mutually agreeable method to address the cumulative impacts of marinas, docks, and mooring fields, using an areal or other basis.	RIDEM, CRMC	[See CRMC "Preliminary Agreement," Section 715-05-06 re: implementation and enforcement of state dock and marina policy.]

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I.C.2.	<p>The RIDEM and CRMC should continue to restrict marina expansion and the development of mooring fields in all marine waters that are:</p> <ol style="list-style-type: none"> Classified as SA or Type 1 or, as appropriate, Type 2 in order to assure that boating activity does not cause water quality degradation. [Note: RIDEM and CRMC permit mooring fields established in Class SA and Type 1 waters before 1988 to remain, although they are not allowed to expand.] Where existing access to shellfish harvesting areas, finfishing areas, and bathing beaches may be jeopardized by potential increases in boat sewage discharges. Where water quality standards are already exceeded <i>unless</i> the applicant can demonstrate that the proposed activity will not result in further water quality degradation. Included within the boundaries of marine sanctuaries such as the Narragansett Bay National Estuarine Research Reserve (NB-NERR). Identified as important breeding, spawning, nursery or foraging habitats for commercially, recreationally or ecologically important plants and animals. Identified as shellfish harvesting areas that are of significant or outstanding commercial or recreational value. [However, RIDEM should <i>not</i> issue Rhode Island Pollutant Discharge Elimination System (RIPDES) discharge permits to marinas at this time because of the difficulty in defining the land and water area that would be subject to permit limitations at each facility.] 	RIDEM, CRMC, Mass. counterparts	[See CRMC "Preliminary Agreement," Section 715-05-06 re: restriction of marina expansion in vicinity of critical marine habitats.]

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I.C.3.	<p>The U.S. Army Corps of Engineers (USACOE), RIDEM, CRMC, and their Massachusetts counterparts should require developers of marina facilities to submit complete plans for the collection, treatment and disposal of boater wastes as part of the application for a permit to expand or develop new facilities.</p> <p>a. The size of on-site holding tanks for boater wastes should be based on the projected volume of boater waste that could be generated within a two week period assuming all boaters served by the facility use the pump-out and waste disposal services provided by the facility. In order to allow "down-sizing" of holding tanks where physical site restrictions exist, the RIDEM should require more frequent pump-outs and establish a mandatory holding tank maintenance schedule as a condition of permitting.</p> <p>b. In lieu of facility-specific information regarding the number of vessels, occupancy rate and frequency of use, dimensional requirements for holding tanks should be based on calculations of waste generated per boat per three day period presented in the <i>Marina Task Study</i> (Raytheon, 1978).</p>	ACOE, RIDEM, CRMC, Mass. counterparts	
I.C.4.	<p>Marinas and other marine facilities that are presently served by on-site septic systems should be required to tie-in to municipal wastewater treatment facilities (WWTF) when existing or planned sewer lines are located nearby. In addition,</p> <p>a. State-approved municipal <i>Harbor Management Plans</i> should contain a policy encouraging vessels that are continuously occupied for more than two days (i.e., "live-aboards") to dock at marinas with direct tie-ins to municipal sewers, shore-based toilet facilities or sewage pump-out facilities.</p> <p>b. The CRMC in cooperation with the RIDEM, the RIMTA, the International Marina Institute (IMI), and other trade organizations, should assess the number and location of "live-aboards" and houseboats using Narragansett Bay facilities in order to evaluate the magnitude of the problem.</p>	Municipalities, private marine facilities, CRMC, RIDEM, RIMTA, IMI	See "New England Coastal Marine Pumpout Survey" (IMI, 1992) re: marina waste disposal.

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I.C.5.	<p>To the fullest extent allowed by law, RIDEM and MADEP shall require WWTFs to accept septage generated within the WWTF's municipal service area as a condition of the WWTF's RIPDES/NPDES permit. In addition, to the fullest extent allowed by law, state grants and subsidized loans awarded to WWTFs shall be conditioned upon the WWTF's acceptance of septage generated within the WWTF's municipal service area, unless RIDEM or MADEP, as appropriate, has waived the septage disposal requirement. [See 04-01-05 Source Control: On-site Sewage Disposal Systems.]</p> <p>a. The RIDEM should require municipal WWTFs that are <i>not</i> presently accepting boater waste from boating facilities within their jurisdiction or service area to include provisions for direct marina tie-ins and treatment of boat septage as a mandatory part of the facility planning process.</p> <p>b. The RIDEM, with input from the CRMC and the Rhode Island Septage Management Task Force, should continue to work with WWTFs that do accept vessel wastes to encourage them to accept boater wastes from sources outside their jurisdiction or service area.</p> <p>c. Within the limits of their regulatory jurisdiction, the EPA, the RIDEM, the Massachusetts Department of Environmental Protection (MADEP), and local WWTF industrial pretreatment coordinators should develop criteria for chemical treatment and WWTF handling of boat wastes.</p> <p>d. To the extent permitted by law, the EPA, the RIDEM and Massachusetts counterparts should work with the Rhode Island Sea Grant Marine Advisory Service to generate a list of chemicals currently used to treat (disinfect, deodorize) boater wastes that should be phased out of use by 1994.</p>	EPA, RIDEM, CRMC, R.I. Septage Mgt. Task Force, Mass. counterparts, WWTFs, URI Sea Grant	[See RIDEM "Preliminary Agreement," Section 715-05-06.]
I.C.6.	<p>The RIDEM, CRMC and the Rhode Island Septage Management Task Force should include boater septage in their considerations of a statewide policy for septage treatment and disposal, including the establishment of regional wastewater management districts (WWMDs). Municipal <i>Harbor Management Plans</i> should include marinas in WWMDs as districts are developed. Requirements for marinas to be incorporated into WWMDs, as appropriate, should be included in the technical guidance for the establishment of WWMDs.</p>	RIDEM, CRMC, R.I. Septage Task Force, municipalities	

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I.D.	The State of Rhode Island and the Commonwealth of Massachusetts should undertake the following actions to educate boaters about the proper treatment and disposal of boater wastes:		
I.D.1. ✓	<p>The RIDEM Division of Enforcement, Office of Boating Safety should institute a boater education program regarding proper boater waste disposal. This program should:</p> <ul style="list-style-type: none"> a. Provide information on how to install, operate and maintain a MSD. b. Promote the use of MSDs and pump-out stations. c. Describe applicable federal and state laws regarding disposal of boat waste, including federal and state penalties for illegal disposal. d. Identify designated "no discharge areas" and areas where waste disposal is prohibited in order to protect shellfishing waters or bathing beaches. e. Identify the locations of operational pump-out stations, including harbors served by mobile pump-out vessels. The RIDEM Division of Enforcement's Office of Boating Safety or Parks and Recreation should produce a map of Narragansett Bay and adjacent waters that clearly indicates the location of available pump-out stations. The map should: <ul style="list-style-type: none"> i. Include or reference the general schedule of operating hours of pump-out facilities, and the fee schedule for pump-out services. ii. Describe the draft requirements of vessels that may be excluded because of insufficient water depth adjacent to pump-out facilities. iii. Include fees, if any. 	RIDEM, Mass. counterpart	[See RIDEM "Preliminary Agreement," Section 715-05-06.]
I.D.2.	General public educational programs should be performed in conjunction with the University of Rhode Island's Narragansett Bay Classroom, public schools, Rhode Island Marine Trade Association (RIMTA), trade shows, and harbor masters to the maximum extent possible.	RIDEM, RIMTA, URI	
I.D.3	Boater education materials, including EPA's <i>Environmental Guide for Mariners</i> , should be distributed with boat registration forms; through Boater Safety courses offered by U.S. Coast Guard through the U.S. Coast Guard Auxiliary and the RIDEM Division of Enforcement, Office of Boating Safety (and its Massachusetts counterpart), and by relevant marine trades organizations.	USGS, RIDEM, Mass. counterpart	RIDEM distributed EPA's "Guide" at various boat shows in 1992.

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I.D.4.	EPA Region I, RIDEM and appropriate Massachusetts authorities should work together to develop and display a sign that clearly indicates the availability of pump-out facilities. The sign should be immediately recognizable and visible from the water.	EPA, RIDEM, Mass. counterpart	EPA Region I has developed a sign for use in Narragansett Bay in 1992.
I.D.5.	Within the limit of their jurisdiction, the federal and state agencies, RIMTA and other trade organizations should promote and/or require the use of environmentally-safe holding tank additives that will not interfere with OSDS or WWTF performance.	EPA, RIDEM, MADEP, RIMTA, IMI, URI	
I.E.	The State of Rhode Island and the Commonwealth of Massachusetts should undertake the following regulatory actions to regulate boaters with respect to treatment and disposal of boater wastes:		
I.E.1.	The State of Rhode Island and the Commonwealth of Massachusetts should encourage the U.S. Congress to amend the Clean Water Act to require the installation of Type III MSDs with holding tanks, or portable toilets, on all commercial and recreational vessels that are designed with overnight accommodations or are greater than 25 feet in total length and are registered to operate in state waters.	RIDEM, Mass. counterpart, RIMTA, IMI	
I.E.2.	Rhode Island and Massachusetts should promulgate regulations pursuant to existing state authority over pollutant discharges to surface waters that would: a. License some full service maintenance or repair boating facilities as official vessel inspection stations. b. Require all vessels required to have MSDs to be inspected at the time of registration for the presence of properly installed and functioning MSD equipment. [In Rhode Island, this program should be administered by the RIDEM Division of Enforcement, Office of Boating Safety.]	RIDEM, Mass. counterpart	

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I.F.	The State of Rhode Island and the Commonwealth of Massachusetts should undertake or continue the following actions to enforce requirements regarding the treatment and disposal of boater wastes:		
I.F.1. ✓	The RIDEM and the CRMC should continue to work with and encourage marinas to require boaters to obey all rules and regulations relating to boater discharge and to report and, if necessary, expel all violators of these rules. [For example, the RIDEM should consider requiring marine facilities operators to certify that facility users have agreed in writing to comply with all federal, state and local rules and regulations pertaining to the discharge of sewage from boats and that failure to comply may result in termination of any contract or agreement to use the facilities.]	RIDEM, CRMC, Mass. counterpart	
I.F.2. ✓	The RIDEM, CRMC, U.S. Coast Guard and EPA Region I should continue to implement the <i>Interagency Memorandum of Agreement</i> and modify the <i>Agreement</i> as necessary to provide for: a. Increased and consistent U.S. Coast Guard enforcement of MSD equipment requirements during routine inspections of all commercial and recreational vessels operating in state waters. b. Delegation of authority to state and local governments for enforcement of MSD and boater waste disposal requirements. RIDEM and local harbor masters should actively enforce boater discharge regulations enacted as R.I.G.L. 46-12-39 <i>et seq.</i>	EPA, USCG, RIDEM, CRMC, Mass. counterparts, harbor masters	CWA, as amended, and Interagency MOA provide for delegating of enforcement authority. R.I.G.L. 46-12-39 passed in 1991.
I.F.3.	The U.S. Coast Guard, in consultation with the EPA, should review and enforce federal MSD manufacturing, installation and maintenance requirements. [For example, the U.S. Coast Guard should require operators of vessels with Type I and II MSDs to comply with federal and applicable state laws regarding operation, maintenance and required retrofits of MSD equipment. In addition, the Coast Guard Auxiliary should be requested to include inspection for the presence of an approved and operational MSD on-board as a condition of issuing courtesy inspection stickers.]	USCG, EPA	

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SOURCE CONTROL: BOATER DISCHARGES

CODE	POLICY	AGENCIES	STATUS
I.F.4.	Based on agreements reached with the U.S. Coast Guard and to the extent allowed under Section 312 of the Clean Water Act, necessary state and local enabling legislation and regulations should be drafted that describe requirements for MSD installation and use, discharge limitations, disposal, treatment and enforcement. [NOTE: The Rhode Island General Assembly passed a bill titled "An Act Relating to Marine Discharge of Sewage" during the 1991 legislative session. The statute a) prohibits boat discharges of sewage in the waters of the state unless treated with a Type I or Type II MSD in "proper working condition"; b) prohibits boat discharges of sewage in any area declared to be a no-discharge area; c) authorizes RIDEM, harbormasters, assistant harbormasters, and police officers to enforce the provisions of the Act; and d) establishes penalties for violations of the provisions of the Act (R.I.G.L. 46-12-39).]	RIDEM, Mass. counterpart, municipalities	
I.F.5.	The RIDEM and its Massachusetts counterpart should establish penalties for violation of sewage discharge regulations. For example, penalties could include fines, payable by mail; and/or loss of state boat registration privileges; or loss of permission to operate in state waters for out-of-state boaters.	RIDEM, Mass. counterpart	
I.F.6.	Municipal <i>Harbor Management Plans</i> should include plans for increasing and enforcing the use of available marina pump-outs. For example, a. Municipalities should establish fines for boaters who discharge untreated sewage (or solid waste) in local waters. b. Docking privileges should be conditional on use of available pump-out facilities. c. Municipalities should be encouraged to appoint full-time harbormasters and harbormasters should be delegated full inspection and enforcement powers in conjunction with RIDEM and the U.S. Coast Guard as part of the <i>Interagency Memorandum of Agreement</i> and R.I.G.L. 46-12-39.	RIDEM, CRMC, Municipalities	Seven of twenty-one draft Harbor Management Plans submitted for CRMC, RIDEM review; seven approved by CRMC, two approved by RIDEM as of June 1992.

✓ - High Priority Action

RECOMMENDED POLICIES AND ACTIONS **SOURCE CONTROL: BOATER DISCHARGES**

CODE	POLICY	AGENCIES	STATUS
I.F.7.	<p>Owners and operators of public and private marinas, yacht clubs, etc., should enforce the use of pump-out facilities by their customers by:</p> <ol style="list-style-type: none"> Providing mobile pump-out vessels in combination with shore-based facilities to increase convenience of the service, ensure a higher rate of boater compliance, and increase boater awareness of equipment and discharge requirements. Contractually linking docking privileges with proper disposal of boat wastes. For example, harbormasters and marina operators should consider requiring valve seals on vessels with overboard discharge fittings and/or using dye tablets to monitor for improper overboard discharges. Including the cost of pump-outs in the docking fee and/or offering coupons, rebates or other incentives to promote the use of pump-out facilities. 	Municipalities, private marine facilities	
I.G.	<p>The State of Rhode Island and the Commonwealth of Massachusetts should undertake the following actions to assist in financing the treatment and disposal of boater wastes:</p> <ol style="list-style-type: none"> Rhode Island and Massachusetts should investigate the possibility of increasing the pass-through of federal and state funds available from boat registration fees to coastal communities in order to support local enforcement of equipment and discharge requirements. Rhode Island should investigate the possible use of the State Revolving Fund to provide low-interest loans to public and private operators of marine facilities for the construction of marine pump-out facilities. 	RIDEM, RICWPFA, Mass. counterparts	

✓ - High Priority Action

RECOMMENDED POLICIES AND ACTIONS **SOURCE CONTROL: BOATER DISCHARGES**

CODE	POLICY	AGENCIES	STATUS
II.	The State of Rhode Island and the Commonwealth of Massachusetts should petition the EPA to designate all or part of Narragansett Bay as a "no discharge area" for vessel discharges.		
II.A.	<p>By 1995, the State of Rhode Island and the Commonwealth of Massachusetts should petition the EPA pursuant to 40 CFR §140.4 to designate all or part of Narragansett Bay as a "no discharge area" in order to abate vessel-related sources of fecal contaminants and to better protect water quality, critical marine habitats, important living resources, and existing and future water quality-dependent uses of Narragansett Bay. Pursuant to 40 CFR §140, the petition must include:</p> <ol style="list-style-type: none"> 1) a certification that the protection and enhancement of the waters described in the petition requires greater environmental protection than that provided by the applicable federal standard; 2) a map showing the location of commercial and recreational pump-out facilities; 3) a description of the location of pump-out facilities within waters designated for no-discharge; 4) the general schedule of operating hours of the pump-out facilities; 5) the draft requirements on vessels that may be excluded because of insufficient water depth adjacent to the facility; 6) information indicating that treatment of wastes from such pump-out facilities is in conformance with federal law; and 7) information on vessel population and vessel usage of the subject waters. <p>[In addition, EPA Region I, which reviews "no discharge area" petitions in the New England region, encourages petitioners to include:</p> <ol style="list-style-type: none"> 1) information on the percentage of boats with Type 3 MSDs, if possible; and 2) identification of aquatic recreational areas, aquatic sanctuaries, identifiable fish spawning or nursery areas and areas of intensive boating activity.] 	RIDEM, CRMC, Mass. counterparts, municipalities, EPA	[See EPA Region I and RIDEM "Preliminary Agreements," Section 715-05-06.] RIDEM will petition EPA for "no discharge area" status for Jamestown and Block Island as high priorities in 1992 or 1993

✓ - High Priority Action

RECOMMENDED POLICIES AND ACTIONS
SOURCE CONTROL: BOATER DISCHARGES

CODE	POLICY	AGENCIES	STATUS
II.B. ✓	In its petition, the State of Rhode Island and the Commonwealth of Massachusetts should specifically identify certain regions of Narragansett Bay such as the Narragansett Bay National Estuarine Research Reserve (NB-NERR) (seaward to the 18 meter isobath), Greenwich Bay, Dutch Island Harbor, Wickford Harbor, Newport Harbor, Great Salt Pond, and the coastal ponds as appropriate for "no discharge" status.	RIDEM, CRMC, municipalities, EPA	[See RIDEM "Preliminary Agreement," Section 715-05-06 re: Great Salt Pond.]
II.C.	In its certification to EPA that the protection and enhancement of the waters described in the petition require greater environmental protection than the applicable federal standard, the State of Rhode Island and the Commonwealth of Massachusetts should emphasize their value as marine sanctuaries; shellfish management areas; historic and scenic waterfronts; and should supply evidence that boat sewage discharges may be contributing to water quality degradation and/or limitations on historic or existing water quality-dependent uses.	RIDEM, CRMC, Mass. counterparts, municipalities, EPA	

✓ - High Priority Action

Estimated Cost of Implementation—Source Control: Boater Discharges

Table 715-04(6) summarizes the estimated costs associated with implementing the recommendations in this chapter. Most of the recommended actions are to be implemented in 1992-93. Initial activities include reconciling state water quality and water use policies, instituting and enforcing boater discharge regulations, and developing criteria for the treatment and disposal of boater wastes. (The issue of industrial pretreatment standards for boater wastes is partially costed under 04-01-01 Source Reduction: Toxics). RIDEM and CRMC will require funding for additional staff, legislative costs, and minor capital investment. MADEP and MACZM will incur costs for agency coordination and public education.

Element IB (Establish Pump-outs) includes a major capital cost for the construction of marina pump-out stations. Based on a survey of Rhode Island and Massachusetts marinas (public and private), the average cost of installing a pump-out facility was \$11,500; this varies with proximity to sewer lines, desired capacity, and staffing needs. Boaters could be charged a pump-out fee to partially subsidize the operation of pump-out facilities. Two hundred ninety-five marinas in New England responded to a boating use survey conducted in 1991; according to this survey, the average regional cost per pump-out was \$4.00, although the range was between \$50.00 and \$0.00 per pump-out (IMI, 1992:37). Lower fees will, however, provide an incentive for boaters to use the service.

State costs represent construction of marine pump-outs in State parks with major boating facilities, and could be partially subsidized with pump-out fees. The cost of installing marine pump-out facilities in municipal harbors could be partially subsidized by State Revolving Fund (SRF) loans to municipalities. The Rhode Island SRF (Clean Water Protection Finance Agency) could also potentially provide loans to private marina operations if the loans were funneled through the municipal government. Municipal and private pump-out facilities could be operated on a cost-recovery basis via pump-out fees.

Private operators could also include the cost as part of the seasonal docking fee, with or without a redeemable coupon for each pump-out.

Element IC (Collection and Treatment) contains a recommendation that marinas presently served by OSDs be required to hook up to municipal WWTFs, if possible. Marina owners would be responsible for the cost of installing a sewer line, and for annual sewer use charges. Sewer expenses could be recovered through increased docking fees. Element ID (Public Education) includes annual costs to RIDEM for developing and distributing educational materials to the boating public. Element IE (Regulatory Actions) recommends that all recreational and commercial vessels greater than 25 feet, designed with overnight accommodations, be required to install Type III marine sanitation devices (MSDs). Enforcement of this requirement will represent a cost to boaters that are not already in compliance. This section also recommends that some boat yards become state vessel inspection stations; additional staff time and equipment could be covered by inspection fees.

For further details regarding the CCMP cost estimation process and funding strategies, refer to the *Narragansett Bay CCMP Cost Estimation and Funding Report* (Apogee Research Inc./NBP, 1992).

Table 715-04(6)

**ESTIMATED COST OF IMPLEMENTATION
SOURCE CONTROL: BOATER DISCHARGES**

**COST ESTIMATES BY
ELEMENT**

	92-93		93-94		94-95		95-96		96-97		Total 92-97	
	Personnel	Other	Personnel	Other	Personnel	Other	Personnel	Other	Personnel	Other	Personnel	Other
IA-Administrative Actions	10,000	0	0	0	0	0	0	0	0	0	10,000	0
IB-Establish Pump-Outs	20,000	101,250	0	0	0	0	0	0	0	0	20,000	101,250
IC-Collection and Treatment	87,500	0	0	0	25,000	0	0	0	0	0	112,500	0
ID-Public Education	17,500	6,000	10,000	6,000	10,000	6,180	10,000	6,000	10,000	6,000	57,500	30,180
IE-Regulatory Actions	25,000	0	0	0	10,000	0	10,000	0	10,000	0	55,000	0
IF-Enforcement Actions	27,500	0	0	0	12,500	0	0	0	0	0	40,000	0
IG-Financing Treatment	22,500	0	0	0	0	0	0	0	0	0	22,500	0
II-"No Discharge" Zone	0	0	0	0	0	0	0	0	0	0	0	0
TOTALS	210,000	107,250	10,000	6,000	57,500	6,180	20,000	6,000	20,000	6,000	317,500	131,430
TOTAL BY YEAR		317,250		16,000		63,680		26,000		26,000		448,930

**COST ESTIMATES BY
AGENCY**

	92-93		93-94		94-95		95-96		96-97		Total 92-97	
	Personnel	Other	Personnel	Other	Personnel	Other	Personnel	Other	Personnel	Other	Personnel	Other
RIDEM	108,750	39,750	5,000	6,000	22,500	6,090	10,000	6,000	10,000	6,000	156,250	63,840
RI CRMC	27,500	0	0	0	25,000	0	0	0	0	0	52,500	0
RI CWPFA	5,000	0	0	0	0	0	0	0	0	0	5,000	0
URI	5,000	0	0	0	0	0	0	0	0	0	5,000	0
MADEP	48,750	0	5,000	0	10,000	90	10,000	0	10,000	0	83,750	90
MACZM	5,000	0	0	0	0	0	0	0	0	0	5,000	0
Municipalities*	0	67,500	0	0	0	0	0	0	0	0	0	67,500
WWTFs	10,000	0	0	0	0	0	0	0	0	0	10,000	0
TOTALS	210,000	107,250	10,000	6,000	57,500	6,180	20,000	6,000	20,000	6,000	317,500	131,430
TOTAL BY YEAR		317,250		16,000		63,680		26,000		26,000		448,930

* Ultimate implementation costs will vary for each municipality depending on its particular environmental and institutional conditions. In addition, the estimated municipal implementation costs do not include ultimate program and capital costs that may result from completion of underlying planning activities, or costs that are expected to be completely recoverable from user fees.

04-01-07 Source Reduction: Nonpoint Sources

Objective for the Reduction of Nonpoint Source Inputs

The State of Rhode Island and the Commonwealth of Massachusetts should reduce loadings of nonpoint source pollutants to Narragansett Bay.

Introduction

Nonpoint source pollution results from rain, snowmelt and groundwater transporting pollutants from many diffuse sources on the land surface. Some of the resulting pollutant load is entrained, decomposed or biologically assimilated. However, some of these pollutants are transported via surface runoff or percolation into the groundwater, and are subsequently deposited into streams, rivers, ponds, lakes, drinking water supply reservoirs, wetlands, and coastal waters (Boyd, 1991; EPA, 1991a). Although nonpoint source pollutants are continuously generated, they are differentiated from fixed, point sources by their sporadic and spatially variable nature.

Urban, residential, agricultural, commercial, and industrial activities contribute to nonpoint source pollution. As a result, nonpoint source pollutants discharged or released anywhere within the Narragansett Bay watershed have the potential of finding their way into the Bay via stormwater runoff or groundwater seepage. The potential for nonpoint source pollution increases as a function of the type, distribution and intensity of land use. The gradual increase of impervious or paved surfaces and the alteration of natural drainage patterns also results in increased volumes, peak discharges, and velocities of runoff (Stuart, 1991:1).

The quantity and quality of stormwater runoff reaching a waterbody is influenced by the size of the land area draining to the waterbody (*i.e.*, the basin or watershed), the use and management of that area, the slope of the land, and the physical characteristics of the path runoff follows as it flows through the drainage area. In general, as a drainage

area becomes urbanized, the rate of flow (peak discharge) and volume of runoff increases significantly. Increased human activity results in more pollutant sources, and increased runoff volume and velocity (due to smoother surfaces) (Stuart, 1991:7). It should be noted, however, that wetlands provide an important function in the landscape by improving water quality, reducing sedimentation and storing stormwater runoff. Many water quality impairments are exacerbated by activities that interrupt the natural hydrological, physical, and biological processes of wetlands.

Statement of the Problem

The U.S. Department of Agriculture Soil Conservation Service (USDA SCS) has identified urban and residential runoff, runoff and leachate from failing septic systems, and sediment erosion from construction and agricultural sites as significant nonpoint sources of pollution within the watershed of Narragansett Bay (USDA SCS, 1990:2). Runoff from impervious surfaces (such as highways, roads, parking lots, and driveways) can carry sediment, metals, organic chemicals, and nutrients. Runoff from agricultural lands, livestock operations, sewage sludge landfills, lawns, and failed or failing septic systems can also carry fecal contaminants in addition to nutrients, sediments, and toxic substances, *e.g.*, pesticides (Stuart, 1992:3; Karp *et al.*, 1990:41). While forests are a major land type within the Bay watershed, less than one per cent, or 3,000 acres, of timber is commercially harvested each year. As a result, timber harvesting or *silviculture* appears to be an insignificant contributor of nonpoint source pollution to the Bay, noting that clear-cutting for urban development does result in nutrient releases and soil erosion (USDA SCS, 1990:2).

Figure 715-04(4) shows the potential pollutants associated with several land covers commonly found in the Narragansett Bay watershed. The land covers are listed in order of the volume of runoff likely to be generated given the same amount of rain on the same soil type, with the lowest runoff volume first.

Figure 715-04(4): Land Cover vs. Associated Potential Pollutants.

Low Runoff	
'Natural' areas (wood, brush, unmanaged areas)	Nutrients
Managed grass (lawns, golf courses, hay, pasture, orchards)	Nutrients, pesticides
Cultivated land	Nutrients, pesticides, sediment
Construction sites Roads, parking lots	Sediment, nutrients Petroleum products, salts, metals, sediment
High Runoff	

[*Note: Addition of animal or human waste to any of these land covers adds pathogens and nutrients to the list of potential pollutants.*]

One hundred and sixty four (164) surface water segments within the Narragansett Bay watershed were assessed by Rhode Island and Massachusetts as part of the 1988 *Nonpoint Source Assessments* in conjunction with development of the state Section 319 *Nonpoint Source Management Plans*. Surface runoff was identified as a major nonpoint source pollution transport mechanism in 70 percent of the waterbodies in Rhode Island with nonpoint source pollution problems. Failed on-site sewage disposal system (OSDS) and groundwater contamination were implicated in 49 percent of Rhode Island waterbodies with nonpoint source pollution problems. In Massachusetts, the reported figures were 43 percent for surface runoff and 20 percent for septic systems (USDA SCS, 1990:9).

Nutrients and/or eutrophication were identified as a nonpoint source pollution problem in 74 of the 164 assessed surface water segments in the Bay watershed. Agricultural runoff was a contributing source in 15 of the 74 segments; urban and residential runoff was identified as a contributing nonpoint source in 59. Solids and silt were identified as a problem in 61 of the 164 segments, noting that USDA SCS estimates that between 100,000 and 150,000 tons of sediment enters water

bodies in the Bay watershed each year from urban development, construction sites, road runoff and cultivated fields. Nonpoint sources of metals were identified in 29 of the 164 segments; oils and greases in eight; and pesticides in two (Stuart, 1992: 7-11; RIDEM, 1988a; MADEQE, 1989).

In addition, nonpoint sources of fecal contamination have been implicated in the closure of approximately 17,000 acres of potential shellfish-harvesting waters in the Bay (RIDEM, 1990a). Nonpoint sources of fecal waste include runoff or leachate from failed septic systems, livestock operations, other animal waste, and illegal connections of sanitary drains to storm sewers. [*Note: Storm drains, like combined sewers, are considered to be point sources under the federal CWA and the CZMA. However, storm drains are addressed in this chapter because the type of pollutants, frequency of discharge and appropriate source reduction measures are comparable to problems and solutions for stormwater runoff.*]

Effective management of nonpoint source pollution is both technically and institutionally complicated. Potential pollutant sources—such as direct discharges of storm drains, poorly designed, installed or main-

tained septic systems, exposed soil in areas susceptible to erosion, and areas where fertilizers and pesticides are applied—are temporally variable, geographically scattered, and dependent on local physiographic site conditions. As a result, it is often difficult to quantitatively measure the pollutant loads related to a particular source, or to evaluate the relative importance of multiple sources. In addition, land use activities that alter the structure or natural hydrologic regime of wetland and riparian areas can create or exacerbate nonpoint source pollution problems. Similarly, the intensity of land use, e.g., density of septic systems or area of impervious surface, often dictates the magnitude of nonpoint source pollution problems.

The pervasiveness of the nonpoint source problem also complicates management options. Federal, state, and local governments may lead the way by defining control methods, promoting educational efforts, conducting investigations, and providing enforcement activity where necessary. However, success in abating existing pollution sources and preventing new sources will require efforts by the development community, businesses, and individuals, as well as the government. Moreover, because human activities throughout the drainage area affect Bay water quality and habitat, the drainage area needs to be managed *as a whole* in order to effectively reduce incremental, cumulative impacts (Stuart, 1991:7).

Existing Policies

Federal Initiatives for Nonpoint Source Management

The U.S. Environmental Protection Agency (EPA) and the U.S. USDA have historically had primary responsibility for addressing nonpoint source pollution issues pursuant to the federal CWA, the Farm Bill and the Federal Insecticide, Fungicide, and Rodenticide Act. However, recent initiatives under the CZMA of 1990 and the Intermodal Surface Transportation Efficiency Act of 1991 have vested major nonpoint source management responsibilities in the National Oceanic and Atmospheric

Administration's (NOAA) Coastal Zone Management Program and the Federal Highway Administration (FHWA). The major federal programs are briefly described below.

EPA-Administered Programs

The EPA administers nonpoint source planning and regulatory programs under the federal CWA. Section 319 of the federal Water Quality Act of 1987 established the Nonpoint Source Pollution Management Program and required each state to prepare an *Assessment of Sources* and a *Nonpoint Source Management Plan*. Both the Rhode Island and Massachusetts *Assessments* found stormwater runoff to be a significant source of pollutants within the Narragansett Bay watershed. The states' *Nonpoint Source Assessments* were updated in 1990, and the *Nonpoint Source Management Plans* are currently undergoing revision (Stuart, 1991:5). The EPA also administers Section 208 (Areawide Waste Treatment Management) and Section 320 (National Estuary Program) of the federal CWA which require participating states to address nonpoint pollution sources in state basin plans and *Comprehensive Conservation and Management Plans*.

The Water Quality Act (1987) also required the EPA to regulate certain stormwater discharges under the National Pollutant Discharge Elimination System (NPDES). Under the regulations finalized in November 1990, and later amended, industrial stormwater dischargers are required to apply for NPDES permits by October 1, 1992. Municipalities with separate storm sewer systems serving populations of 100,000 or more must also apply, and must develop a program for monitoring and reducing pollutants in the stormwater system by 1993. Worcester, Massachusetts, is the only city in the Narragansett Bay watershed affected by this requirement at the present time. The City of Providence has been exempted from this NPDES requirement because most of the city is served by combined sewers that are regulated under the combined sewer overflow abatement program (Stuart, 1991:18). However, Providence will use a grant from

the Rhode Island Aqua Fund to prepare an inventory of municipally-owned storm sewers, and will follow EPA guidance for detecting illegal upstream inputs.

USDA-Administered Programs

Technical assistance is available through three agencies of the U.S. Department of Agriculture (USDA): the Soil Conservation Service (SCS), the Cooperative Extension Service (CES) and the U.S. Forest Service. Each program relies on the states for delivery of their services to at least some extent. The SCS works with farmers on soil erosion, water quality and water conservation problems by helping them to plan management systems, and designing and inspecting best management practices. SCS is federally-funded, but works under the direction of local Conservation Districts, as established by state law.

The CES, administered through the states' land grant universities, relies on federal, state and local funding. Through research and technology transfer, CES provides land-users with practical technical assistance regarding the selection and care of animals, crop production, pest management (including pesticide applicator training), soil testing for fertilizer needs, and marketing. CES has expanded its programs to provide homeowners with gardening, lawn care and household management assistance as well. Assistance is provided through a local Extension Board.

The Forest Service depends completely on state forestry programs which are partially funded by the U.S. Forest Service. The Massachusetts Department of Environmental Protection (MADEP) Division of Forest and Parks and the Rhode Island Department of Environmental Management (RIDEM) Division of Forest Environment Services provide forest managers with evaluation of timber quality and productivity, preparation of forest management plans, marketing advice, evaluation and control of forest insect and disease problems, a harvesting and sawmill improvement program, certification of nursery stock

(insect and disease free) and the sale of tree seedlings at cost.

Federal financial assistance is available to farmers and forest managers for the installation of soil and water conservation practices and woodland management practices, the purchase and operation of farms, crop insurance, and for controlling the price of some agricultural products. USDA's Farmers Home Administration (FmHA) provides low-interest loans for farm ownership, farm operating expenses and soil and water conservation practices. The USDA Agricultural Stabilization and Conservation Service (ASCS) administers most price-support programs, and shares the cost of installing certain soil and water conservation practices and woodland management practices.

The ASCS in Rhode Island has designated the Narragansett Bay watershed as a Special Project Area under the USDA Water Quality Initiative, which reserves funds for conservation practices within the watershed. SCS can also provide cost-sharing for conservation practices under its Watershed Protection Program. Under the USDA Water Quality Initiative, CES and SCS are combining efforts within specified geographic areas to work more closely with farmers in protecting water quality. The Pawcatuck River (R.I.) and Buzzard's Bay (MA) "Hydrologic Units" are two nearby areas that were selected for this special emphasis. Selection of areas and plan preparation are coordinated with the states' 319 Nonpoint Source Management and National Estuary Programs.

NOAA- Administered Programs

Section 6217 of the CZMA Reauthorization Amendments of 1990 represents another important federal nonpoint source initiative (Stuart, 1991:6). Section 6217 requires states to establish Coastal Nonpoint Pollution Control Programs (CNPCP) to "develop and implement management measures for non-point source pollution to restore and protect coastal waters..." (EPA, 1991a). As of May 1991, EPA and NOAA have jointly issued two draft documents that provide guidance for

states to develop CNPCPs: *Proposed Guidance Specifying Management Measures for Sources of Nonpoint Pollution in Coastal Waters* (EPA, 1991a) and *Coastal Nonpoint Pollution Control Program: Program Development and Approval Guidance* (NOAA/EPA, 1991).

State CNPCPs must "provide for the implementation, at a minimum, of management measures in conformity with the guidance published under subsection (g) to protect coastal waters generally" (EPA, 1991a:1-5). In addition CNPCPs must:

"(1) Identify land uses which, individually or cumulatively, may cause or contribute significantly to a degradation of (a) coastal waters where there is a failure to attain or maintain applicable water quality standards or protect designated uses, or (b) coastal waters that are threatened by reasonably foreseeable increases in pollution loadings from new or expanding sources;

"(2) Identify critical coastal areas adjacent to coastal waters identified under the preceding paragraph;

"(3) Implement additional management measures applicable to land uses and areas identified under paragraphs (1) and (2) above that are necessary to achieve and maintain applicable water quality standards and protect designated uses;

"(4) Provide technical assistance to local governments and the public to implement management measures;

"(5) Provide opportunities for public participation in all aspects of the program;

"(6) Establish mechanisms to improve coordination among State and local agencies and officials responsible for land use programs and permitting, water quality permitting and enforcement, habitat protection, and public health and safety; and

"(7) Propose to modify State coastal boundaries as necessary to implement NOAA recommendations under Section 6217(e), which are based on findings that inland boundaries must be modified to more effectively manage land and water uses to protect coastal waters" (EPA, 1991a:1-5 to 1-6).

Specific management measures are also proposed for several major sources of nonpoint pollution, including: (1) agricultural runoff; (2) urban runoff (including developed and developing areas); (3) silvicultural (forestry) runoff; (4) marinas and recreational boating; and (5) hydromodification, dams and levees, and shoreline erosion (EPA, 1991a: 1-9). The CNPCP will not include management measures for point source of pollutants regulated under the CWA (e.g., combined sewer overflows, wastewater treatment facilities, storm drains, and boats).

CNPCPs are intended to "serve as an update and expansion of existing nonpoint source management programs and are to be coordinated closely with the existing coastal zone management programs", and "the state coastal zone and water quality agencies are to have co-equal roles" in developing the CNPCP (EPA, 1991a:1-5). Section 6217 also requires the CNPCP "to be coordinated with existing CWA programs under sections 208, 303, 319, and 320", as well as to establish coordination mechanisms with other agencies and officials responsible for various aspects of nonpoint source pollution control (NOAA/EPA, 1991:vii). The requirements for the state CNPCP described in draft NOAA and EPA guidance (EPA, 1991a; NOAA/EPA, 1991) mandate that the plan be well coordinated with CWA section 320 programs (i.e., Comprehensive Conservation and Management Plans produced by National Estuary Projects). Thus, the development of the Rhode Island CNPCP under Section 6217 of the 1990 Reauthorization of the CZMA should use the Narragansett Bay *Comprehensive Conservation and Management Plan (CCMP)* and other relevant nonpoint source policies, plans and regulations to the greatest

extent possible. Conversely, implementation of relevant sections of the Narragansett Bay CCMP should be structured so as to be compatible with final guidance for CNPCPs.

Most significantly, state CNPCPs must contain "enforceable policies and mechanisms to implement the applicable requirements of the coastal nonpoint programs" as defined under Section 316 of the CZMA. Each state's CNPCP must be approved by both NOAA and EPA and will be implemented through changes to the state's nonpoint source pollution program (Section 319 of the CWA) and coastal zone management program (Section 306 of the CZMA) (NOAA/EPA, 1991: v). Failure to implement a CNPCP may result in loss of portions of federal funds allocated by NOAA and EPA to state CZMA Section 306 and CWA Section 319 programs.

State Initiatives for Nonpoint Pollution Management

Rhode Island and Massachusetts have both established state nonpoint source management programs pursuant to Section 319 of the federal Clean Water Act. Rhode Island's Nonpoint Source Management Program, which is administered through RIDEM's Office of Environmental Coordination, devoted the early years of the program to preparing the *Nonpoint Source Assessment* and the *Nonpoint Source Management Plan*. Subsequent state efforts included the preparation of technical guidance and model ordinances, and coordinating nonpoint source planning efforts with regulatory programs. Both states established external advisory committees to assist in the preparation of the nonpoint source management plans. Rhode Island established a 19-member Water Quality Advisory Committee in 1988 to assist in the development of the State Clean Water Strategy, including the *Nonpoint Source Management Plan*. The Committee included representatives from RIDEM's regulatory divisions, the Rhode Island Division of Planning (RIDOP), the Rhode Island Coastal Resources Management Council (CRMC), USDA SCS, the University of Rhode Island (URI), environmental advocacy groups, local government, and the Narragansett Bay Project (NBP). This

Committee has not met, however, since the publication of the *Nonpoint Source Management Plan* (Stuart, 1991:5). The Commonwealth of Massachusetts established a 50-member advisory committee under the direction of the MADEP, and a nine-member Steering Committee chaired by Massachusetts Coastal Zone Management (MACZM) to advise MADEP on the development of the state's *Nonpoint Source Management Plan* (Stuart, 1991:5).

The Rhode Island *Nonpoint Source Management Plan* established a system for ranking the state's waters based on their condition, use and need for remedial action. The *Nonpoint Source Assessment* (RIDEM, 1990c) evaluated the state's waters to determine whether they were impaired (i.e., not attaining their designated use according to the *Water Quality Regulations for Water Pollution Control*, RIDEM 1988b) or threatened (i.e., in full support of designated uses, but subject to impairment by pollutants occurring in the watershed). The *Nonpoint Source Management Plan* then established established criteria for prioritizing assessed waterbodies for protection or restoration efforts based on their drinking water supply, bathing and recreation, habitat, and fish and wildlife value, recognizing that human use and habitat function are equally valuable protected uses (Stuart, 1991:4). The ranked list is used to prioritize state efforts to restore impaired waterbodies and protect threatened waters. The Massachusetts *Nonpoint Source Management Plan*, on the other hand, does not currently have a documented priority-setting process (Stuart, 1991:4).

Rhode Island's Nonpoint Source Management Program also developed some of the technical guidance and regulatory framework needed to begin to address nonpoint source issues, and worked with the NBP-sponsored Land Management Project to provide technical assistance to cities and towns in preparing their local comprehensive land use plans. The *Rhode Island Soil Erosion and Sediment Control Handbook* (RIDEM, 1989e) was revised to serve as a design manual for best management practices (BMPs), and Rhode Island erosion and sediment control enabling legislation was

revised to reflect the needs of local officials. RIDEM's efforts in 1991 focussed on developing performance standards for stormwater control BMPs as the basis for regulatory permits (e.g., the RIDEM freshwater wetlands program). Regulations, applicability criteria, and performance standards are presently in draft form (Stuart, 1991: 6,17). In addition, the CRMC has agreed to base its stormwater regulations on the standards developed by RIDEM, thus making the Council's regulations consistent with RIDEM's. Stormwater management is required, for example, in certain Special Area Management (SAM) Plans, and new development proposals requiring CRMC permits must maintain the present quantity and quality of stormwater leaving the site (Stuart, 1991:6, 17).

Apart from the nonpoint source planning initiative established under Section 319, the states regulate other aspects of the nonpoint source pollution problem through their agricultural, pesticide, groundwater, wetlands and on-site sewage disposal regulatory programs. Both states also work with USDA Conservation Districts and Cooperative Extension Service to provide technical assistance, including site plan review, to municipalities and individual property owners. In addition, the Narragansett Bay Project-sponsored Land Management Project (LMP), which operated in conjunction with Rhode Island's Nonpoint Source Management Program between 1988 and 1992, played a key coordinating function among the agencies and organizations responsible for nonpoint source management. The LMP developed outreach materials and guidance documents, compiled model ordinances from other jurisdictions, and actively assisted cities and towns throughout the watershed in evaluating regulatory controls and structural BMPs for nonpoint source pollution control.

Analysis

Coordination of Nonpoint Source Management Programs

Perhaps the greatest impediment to implementation of an effective nonpoint source management strategy is the difficulty of

coordinating the activities of the numerous agencies and organizations involved. Both Rhode Island and Massachusetts should maintain permanent state nonpoint source advisory committees with participation by federal, state and local resource management agencies, environmental advocacy groups, academia, and other interest groups. RIDEM and CRMC should consider developing an umbrella organization that builds on the advisory committees organized by Save the Bay and USDA SCS. The Environmental Data Centers at URI and MACZM, which supply statewide computer mapping and data analysis through their respective Geographic Information Systems (GIS), should also become important mechanisms for sharing information to assess potential nonpoint source pollutant contributions from changes in land use (Stuart, 1991:4). In addition, the statewide CNPCP that will be developed jointly between CRMC and RIDEM, as required by Section 6217 of the 1990 Amendments to the CZMA, will require enhanced coordination between relevant federal, state, and local agencies if it is to receive approval from the EPA and NOAA. Without such federal approval, both RIDEM's Section 319 Program and CRMC's Section 306 funding will be penalized.

Nonpoint Source Pollution Assessments and Planning

Section 319 of the CWA encourages states to update their *Nonpoint Source Assessments* as part of the state *Clean Water Strategy* and the *State of the State's Waters* reports required under Section 305(b) of the Act. In general, *Nonpoint Source Assessments* provide a great deal of information, and should be regarded as a major reference for implementing agencies and organizations. However, of the 200 waterbody segments making up the Narragansett Bay watershed, 39 along the Blackstone and Taunton Rivers in Massachusetts have not been evaluated. Since implementing agencies are expected to focus their efforts on priority waterbodies based on criteria and data reported in the *Nonpoint Source Assessments*, it is imperative to evaluate all waterbody segments, including wetlands.

Both Rhode Island and Massachusetts should use information gathered by citizen monitoring programs to supplement the state *Nonpoint Source Assessments*, particularly where the states do not have other recent sources of data (Stuart, 1991:15-16). A number of citizen-based water quality monitoring programs are already underway in the Narragansett Bay watershed. In addition, the Narragansett Bay Project established a Citizens Monitoring Coordinator position in 1990 to help coordinate the various Rhode Island programs, provide a liaison between the volunteer groups and RIDEM, and establish standardized sampling, analytical and reporting procedures (Stuart, 1991:16). The position, which is administered by RIDEM's Division of Water Resources, should be made permanent and Massachusetts should establish a similar position.

As noted above, the Massachusetts *Nonpoint Source Management Plan* does not have a documented priority-setting process to target waterbodies for protection and restoration. Although a substantial effort may be required to develop a joint nonpoint source priority ranking system, it would represent an invaluable step for directing basinwide efforts toward "protecting the best and fixing the worst" interstate waterbodies. The state Nonpoint Source Advisory Committees could be used to establish common goals and criteria for prioritizing implementation efforts in the Narragansett Bay basin. In addition, federal and state nonpoint source control implementation efforts in both states should be directed toward protecting and restoring the highest priority waterbodies in order to focus available funding and reduce unnecessary duplication of effort. Recognizing that nonpoint source controls should be the highest priority for some waterbodies, Rhode Island and Massachusetts should also develop a method for reconciling the nonpoint source priority list with the 305(b) point source and 303(d) waterbody priority lists in order to assure that available water pollution control funds are used effectively.

Regulation of Nonpoint Pollution Sources

Although RIDEM is scheduled to release draft stormwater control regulations by

October 1992, the logistics and staff requirements involved with issuing and enforcing NPDES permits for each municipal and industrial stormwater discharge are significant and probably impossible to meet at the present time (Stuart, 1991:18). The EPA has issued draft guidance to assist state and local officials in detecting illegal sewer connections to storm drains. Technical guidance for communities seeking to abate and eliminate stormwater discharges is available through the state's *Nonpoint Source Management Plan* and the *Recommendations of the Stormwater Management and Erosion Control Committee Regarding the Development and Implementation of Technical Guidelines for Stormwater Management* (RIDEM, 1988a). The management measures identified as part of the proposed CNPCP to control nonpoint source pollution from urban sources (EPA, 1991a:4-1 to 4-47) will also help to reduce loadings to urban storm drains. The state and local governments should also consider using shoreline survey data collected by citizens' monitoring programs to identify illegal dry weather storm drain discharges. However, additional guidance is needed from EPA regarding appropriate stormwater discharge survey, prioritization and abatement strategies. [See 04-01-02 Source Reduction: Nutrients, and 04-01-05 Source Control: On-Site Sewage Disposal Systems for a discussion of groundwater contamination issues related to septic systems and fertilizer use.]

On the local level, several Rhode Island municipalities have adopted stormwater and nonpoint source-related management ordinances, and some communities have incorporated water quality or flooding considerations in their subdivision regulations. For example, Middletown requires no increase in peak discharge from the two and 25-year storms, and Smithfield includes a nutrient loading determination in the required environmental studies for a subdivision proposal. In addition, as of early 1992, 14 of 39 Rhode Island municipalities had adopted Soil Erosion and Sediment Control ordinances. However, none of the municipal or state programs presently address cumulative water quality impacts, nor are there compre-

hensive programs for mitigating them. Moreover, most cities and towns are not technically or financially equipped to deal with these issues in an aggressive manner (Myers, 1988; Stuart, 1991:7-8). Local comprehensive plans approved by the RIDOP pursuant to Rhode Island's Comprehensive Planning and Land Use Regulation Act (R.I.G.L.45-22.2-1 *et seq.*) will, however, provide the basis for new zoning ordinances and other growth management controls that reflect projected patterns of development and potential sources.

The federal and state agencies also clearly need to provide more effective guidance regarding applicability criteria, and design and performance standards for nonpoint source control best management practices (BMPs). The need for design and performance standards is especially critical when addressing residential or "urban" nonpoint source issues, because concern for nonpoint source pollution in that area is relatively new. The stormwater management standards and applicability criteria developed by RIDEM for its Section 319 *Nonpoint Source Management Plan* should be adopted by all the state nonpoint source control authorities, including the MADEP, Massachusetts Department of Food and Agriculture (MAFA), RIDEM's Divisions of Agriculture and Water Resources, the state coastal zone management agencies (*i.e.*, MACZM and CRMC) and Departments of Transportation, Cooperative Extension Service, Conservation Districts, and USDA SCS (Stuart, 1991:6). To the greatest extent practicable, these agencies should consider BMPs and performance standards recommended in the final Section 6217 CNPCP guidance under development by EPA and NOAA.

Finally, as noted previously, the states maintain a variety of technical assistance programs that address various nonpoint source pollution control issues. The USDA and its affiliated state programs should review the components of an Integrated Pest Management System to reduce the use of pesticides. Selection of pesticides based on water quality impacts, and more effective regulation of pesticide applicators should

also be considered (Stuart, 1991:25). In addition, since roads and other paved surfaces can have a significant impact on stormwater quantity and quality, it is of special importance to ensure that control measures are adequately installed and maintained. Most state and local road construction inspectors are not specialists in nonpoint source management, and may not be able to give these measures the attention they deserve. This may be an area where use could be made of the Conservation Districts' site plan review and inspection programs (Stuart, 1991:21). Rhode Island Conservation Districts could also assist the CRMC in the review and inspection of stormwater management systems in sites within SAM Plan jurisdiction, and could assist RIDEM's Division of Freshwater Wetlands when stormwater management regulations are adopted. Similarly, the Environmental Review Teams available through the Rhode Island Resource Conservation and Development (RC&D) Council should be expanded to have a watershed-based perspective in order to assist municipalities in assessing the cumulative impact of development proposals. Massachusetts' Conservation Districts and RC&D Councils could play a similar role for Massachusetts municipalities in the Bay watershed (Stuart, 1991:23).

Recommended Policies and Actions and *Estimated Cost of Implementation* are presented in the following pages.

RECOMMENDED POLICIES AND ACTIONS **SOURCE REDUCTION: NONPOINT SOURCES**

CODE	POLICY	AGENCIES	STATUS
I.	The State of Rhode Island and the Commonwealth of Massachusetts should develop and implement consistent nonpoint source guidance, standards, and practices for application throughout the Narragansett Bay Watershed, in order to control nonpoint source pollution problems in a consistent manner and reduce duplication of efforts. Guidance developed for the states' Coastal Nonpoint Pollution Control Programs (CNPCP) under Section 6217 of the 1990 Reauthorization of the Coastal Zone Management Act (CZMA) should be considered in revising existing guidance and standards.		
I.A.	<p>Rhode Island and Massachusetts, with assistance from the U.S. Environmental Protection Agency (EPA), should adopt a consistent set of criteria for selecting priority waterbodies, including wetlands, in the Narragansett Bay watershed on which to focus efforts. The criteria used in Rhode Island Department of Environmental Management's (RIDEM) <i>Nonpoint Source Management Plan</i> to rank waterbodies for protection or restoration based on the status, use and ecological values of the waterbody are recommended. [Note: Wetlands are included as "waters of the State of Rhode Island" pursuant to R.I.G.L. 46-12-5. Therefore, unless specifically noted, all references to "waters" or "waterbodies" of the State include wetlands.]</p> <p>1. The environmental management and coastal zone management agencies of Rhode Island and Massachusetts should focus future nonpoint source planning and implementation on those waterbodies identified as high priority for protection and restoration. The states' CNPCPs should use information and ranking criteria developed by state <i>Nonpoint Source Assessments</i> and other related information (e.g., <i>Narragansett Bay Comprehensive Conservation and Management Plan</i>) to the greatest extent possible.</p> <p>2. The states' nonpoint source priority waterbody list should be reconciled with the states' 305(b) point source, and 303(d) waterbody priority lists to the maximum extent possible in order to assure that available implementation funds are used effectively.</p> <p>3. If further delineation of priority watersheds is needed for agency-specific programs, the agency should consult with the Rhode Island Environmental Data Center (EDC) in determining appropriate delineation criteria and any methods available to match waterbodies with their program requirements.</p>	EPA, USDA SCS, RIDEM, CRMC, Mass. counterparts	

✓ - High Priority Action

RECOMMENDED POLICIES AND ACTIONS SOURCE REDUCTION: NONPOINT SOURCES

CODE	POLICY	AGENCIES	STATUS
I.B. ✓	<p>The Rhode Island and Massachusetts (Section 319 and Coastal) Nonpoint Source Coordinators should jointly maintain/reinstate a state Nonpoint Source Management Committee, to guide the nonpoint source control planning process, and to assist in developing new initiatives and the technical guidance needed for implementation. Coordination between the Rhode Island and Massachusetts Committees should be ensured.</p> <p>1. Development of the new Section 6217 CNPCP, and update of the Section 319 <i>Nonpoint Source Management Plan</i> shall be coordinated within each state. EPA and the National Oceanographic and Atmospheric Administration (NOAA) shall make every effort to develop consistent policies and guidance regarding the control of nonpoint source pollution. The guidance developed for the CNPCP (EPA, 1991a) should be used to update the state's Section 319 <i>Nonpoint Source Management Plans</i> to the greatest extent practicable.</p> <p>2. Design standards, applicability criteria, and performance standards for nonpoint source management systems and best management practices (BMPs) should be consistent throughout the Narragansett Bay Watershed to the greatest extent possible. The Rhode Island and Massachusetts Nonpoint Source Management Committees should agree on appropriate standards and should use existing CNPCP guidance (EPA, 1991a) to the greatest extent practicable. The State of Rhode Island should endorse the Rhode Island <i>Nonpoint Source Management Plan</i> and the <i>Recommendations of the Stormwater Management and Erosion Control Committee Regarding the Development and Implementation of Technical Guidelines for Stormwater Management</i> (1988a) for reducing stormwater pollutants.</p>	RIDEM, CRMC, MADEP, MACZM, RIDOT, MA EOTC	[See RIDEM "Preliminary Agreement," Section 715-05-06 re: agreement to establish and jointly chair the Nonpoint Source Management Committee with CRMC. See USDA SCS and RIDOP "Preliminary Agreements," Section 715-05-06 re: agreement to participation on Nonpoint Source Management Committee.]

✓ - High Priority Action